

Mayor's Air Quality Strategy

Progress Report to March 2006

October 2006

Foreword

When I launched my Air Quality Strategy, *Cleaning London's Air*, in 2002, I set out my vision for how London can develop into an exemplary sustainable world city. This is a huge challenge, especially in a city that is growing so fast as London. However, I am pleased with the considerable progress that has already been made since then. Better integrated transport policies has led to a 5 per cent shift from car use to public transport (London is the only major international city to see this sort of change, most are going in the opposite direction), a 72 per cent increase in cycling levels and far more reliable bus journeys. Bus passengers increased 28 per cent from 1,296 million journeys in 1999/2000 to 1,793 million journeys in 2004/5.

This document summarises some of the progress that has been made in the last four years, focussing on the implementation of policies to reduce air pollutant emissions in London across the GLA group, as well as through the wide range of partnerships that are helping to take effective action to improve air quality.

Road transport is responsible for the single largest source of pollutant emissions that are harmful to human health – nitrogen dioxide and particles. Levels have fallen over recent years with newer vehicles, but further reductions are still needed. My priority is still to reduce pollution from traffic. I have ensured TfL continues its work to clean up London's buses and I implemented the London Taxi Emissions Strategy earlier this year. This will be the first time London's 20,000 black cabs have had to meet stringent emissions targets. I have also decided to extend the Congestion Charging zone to help bring further emissions benefits to inner London and I am developing London's Low Emission Zone to encourage operators of diesel HGV's, buses, coaches, and the heaviest, most polluting vans and minibuses to clean up their fleets. Subject to consultation on the Scheme Order, this policy will be implemented in 2008.

Although air pollutant emissions have been cut, we still have a long way to go before all areas in London meet the Government's health based air quality objectives. Air pollution particularly affects the most vulnerable people; the old and very young and people with existing heart and lung conditions. Current levels of air pollution are still predicted to cause just over 1,000 premature deaths and a similar number of extra respiratory hospital admissions each year in London. Weather also plays a very important part in the levels of air pollution and can significantly affect the areas that exceed the UK air quality objectives, a particular cause for concern, given the alarming changes to our climate due to global warming.

Ozone is not emitted by human activity, but is formed in hot, sunny weather. It is at its highest concentrations in the summer and background levels have been rising steadily over the last decade. Action needs to be taken at an international level to reduce emissions of the chemicals that react to form ozone. I will continue to press the Government for further action on this front as ozone levels are predicted to increase further as the results of climate change take effect.

Climate change is now humanity's biggest single threat and cannot be resolved at the level of municipal government alone, although a world city like London needs to play a decisive role in setting an example for the rest of the world to follow. This includes integrating policies to reduce emissions of local air pollutants and carbon dioxide. I will continue to press the UK Government and the EU for concerted action to reduce emissions, but will also work with all Londoners to help make our capital a cleaner, less polluted, and healthier city.

Ken Livingstone, Mayor of London

1. Introduction

The Mayor's Air Quality Strategy, *Cleaning London's Air*, was published in September 2002 and includes policies and proposals aimed at meeting the air quality objectives laid down in European and national regulations. This report reviews the progress made in implementing the strategy in the last 12 months up to the end of March 2006. Previous progress reports are available on the GLA website (www.london.gov.uk).

Like most other large cities around the world, London experiences high levels of air pollution, but although it meets the current objectives for most pollutants and these emissions continue to fall, London has failed to achieve both the annual and hourly objectives for nitrogen dioxide (target dates 31/12/2005) and the annual and daily objectives for fine particles (PM₁₀) (target dates 31/12/2004). Both objectives were exceeded along the major road network and, in addition, the nitrogen dioxide objective was exceeded in inner London and in an area of west London around Heathrow Airport.

Poor air quality damages people's health and quality of life, particularly affecting the most vulnerable in society – the very young, the old and people with existing heart and lung conditions. In 2005 it was predicted that 1031 accelerated deaths and 1088 extra respiratory hospital admissions occurred in London as a result of PM₁₀ air pollution. More information on air pollutants and their health impacts can be found on page 22 of the Mayor's Air Quality Strategy which, like all the documents mentioned in this document, can be found on the GLA website.

2. Context

The GLA Act 1999 requires the Mayor to produce eight strategies; Air Quality, Transport, Spatial Development (the London Plan), Noise, Municipal Waste, Biodiversity, Culture and Economic Development. The Act requires consistency between the strategies to help London develop more sustainably, and for them to be kept under review. The Mayor has also produced other non-statutory strategies, including an Energy Strategy, Waste Action Framework and a Climate Change Adaptation Strategy.

The Act also requires the strategies to be consistent with national policy and international agreements. For the Mayor's Air Quality Strategy, the relevant context is the *Air Quality Strategy for England, Scotland, Wales and Northern Ireland* (referred to as the 'national strategy' in this document) and its 2003 Addendum, and the EU air quality directives. The Mayor's obligations in respect of air quality come under the umbrella of Local Air Quality Management (LAQM), as defined in the Environment Act 1995 and administered by the Department for the Environment, Food and Rural Affairs (Defra) and the Mayor in London. The Mayor has set out policies and proposals to work towards meeting the air quality objectives and the London boroughs have done the same.

Under the LAQM system, local authorities have a duty to review and assess air quality through a phased process and identify those areas where it is likely that the air quality objectives will be exceeded. Local authorities are currently in the third round of review and assessment and the LAQM policy guidance was updated in March 2005 and again in January 2006 to reflect recent developments. More information on London boroughs' progress in LAQM is provided in Section 4.3 below

The national air quality objectives are a set of targets whereby specified concentrations in ambient air are to be met by fixed dates. These objectives address the following pollutants; nitrogen dioxide (NO₂), fine particles (PM₁₀), carbon monoxide (CO), benzene, 1,3-butadiene, lead, sulphur dioxide (SO₂) and provisionally, polycyclic aromatic hydrocarbons (PAH) and ozone

(O₃). More information on these pollutants can be found in Chapters 1 and 2 of the Mayor's Air Quality Strategy.

The government's public consultation on the review of the national air quality strategy closed on 11th July 2006. It was disappointing that the review focussed only on national policies that UK government could implement and did not support measures that regional and local government could take to reduce hotspot concentrations to levels below the national objectives.

Air quality in London

London's 'pea-souper' smogs of the 1950s are now a thing of the past. The ground-breaking clean air legislation that followed the worst smogs forced industry to reduce smoke emissions and encouraged a shift from coal to gas heating in Londoners' homes. As a result concentrations of pollutants such as sulphur dioxide associated with industry and coal burning are no longer a significant problem in modern London, and levels are well below Government and EU targets.

However, half a century on, London's air is still polluted. Indeed it is the worst of any city in the UK and amongst the worst in Europe. Only two pollutants exceed the national air quality objectives, and are of main concern in London today. These are nitrogen dioxide and fine particles, which are significant causes of ill health and mortality in the capital.

There is evidence that long-term exposure to NO₂ may affect lung function and enhance response to allergens in sensitised individuals. It may also increase reactivity to natural allergens and exposure to NO₂ puts children at risk of respiratory infection and may lead to poorer lung function in later life¹. Particulate matter causes inflammation of the airways that may worsen existing lung disease and enhance the sensitivity to allergens for people with hay fever and asthma. Exposure to particulate matter may also have implications for cardiovascular health². Smaller particles have a greater likelihood of reaching the lung and causing adverse health affects.

Road transport is responsible for approximately half of these emissions and contributes significantly to the areas that experience high levels of air pollution - inner London, alongside the major roads, and the area around Heathrow airport.

In addition, there is increasing concern about rising ozone levels. Ozone is a 'secondary' pollutant; it is not emitted directly, but results from reaction of oxides of nitrogen (NO_x) and organic compounds with sunlight in the atmosphere. This process often happens over long distances, and action to reduce ozone needs to be co-ordinated at national and international levels with measures to reduce emissions of the precursor pollutants. Concentrations in the UK are generally less than those in central continental Europe. In addition, peak concentrations in the UK have decreased over the past two decades. Since ozone has to be tackled at an international level, it is not included within the list of pollutants the Mayor and London local authorities have to control. It is not therefore the subject of detailed proposals in the Mayor's Strategy or this report.

Future changes to London's air quality due to climate change are difficult to predict, but it is thought that ozone concentrations may rise due to increased summer temperatures, reduced dispersion during hot, sunny periods and increased solar radiation brought about by reductions in cloud cover.

¹ AQEG, Nitrogen Dioxide in the United Kingdom. Prepared for Defra, Scottish Executive, Welsh Assembly Government and Department of the Environment for Northern Ireland. March 2004.

² AQEG, Particulate Matter in the United Kingdom. Prepared for Defra, Scottish Executive, Welsh Assembly Government and Department of the Environment for Northern Ireland. April 2005.

Monitored air quality in London

The monitored data used in this report comes from the London Air Quality Network run by the Environmental Research Group of King' College London (see www.londonair.org.uk). Monitoring equipment has been placed at over 100 locations in London to measure air pollution concentrations in areas where members of the public are likely to be exposed. The resulting data is then validated or 'ratified', a process that takes up to eighteen months. Fully ratified data is available for 2005.

Figure 1

Relative annual mean concentrations of CO, PM10 and SO2 from 1996 to November 2005

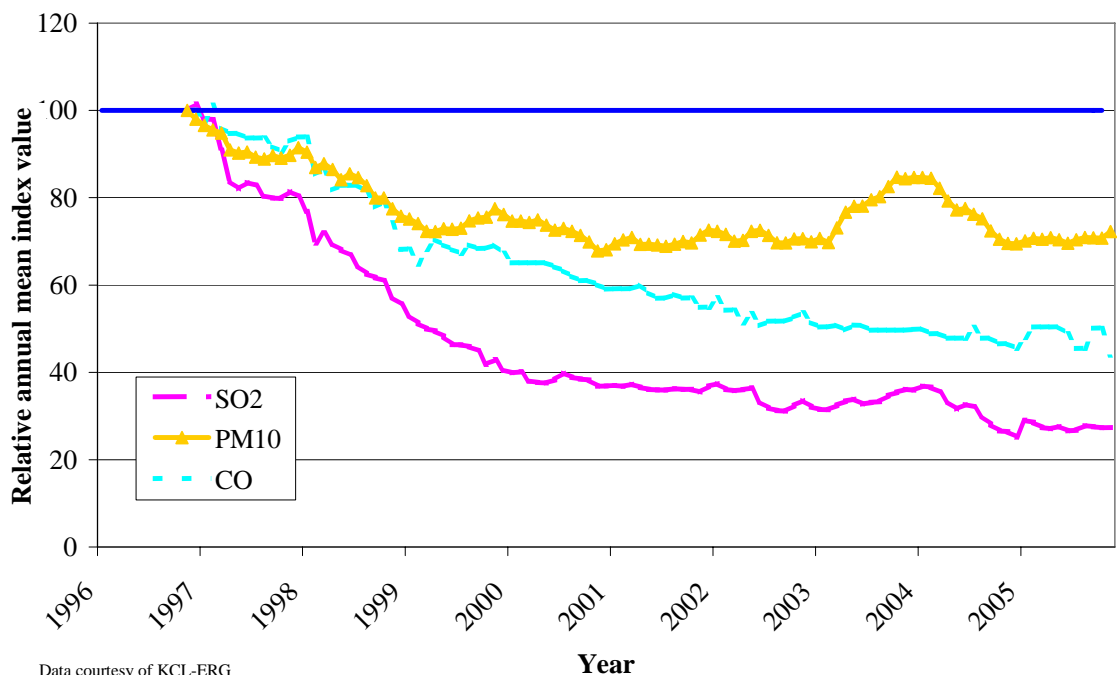
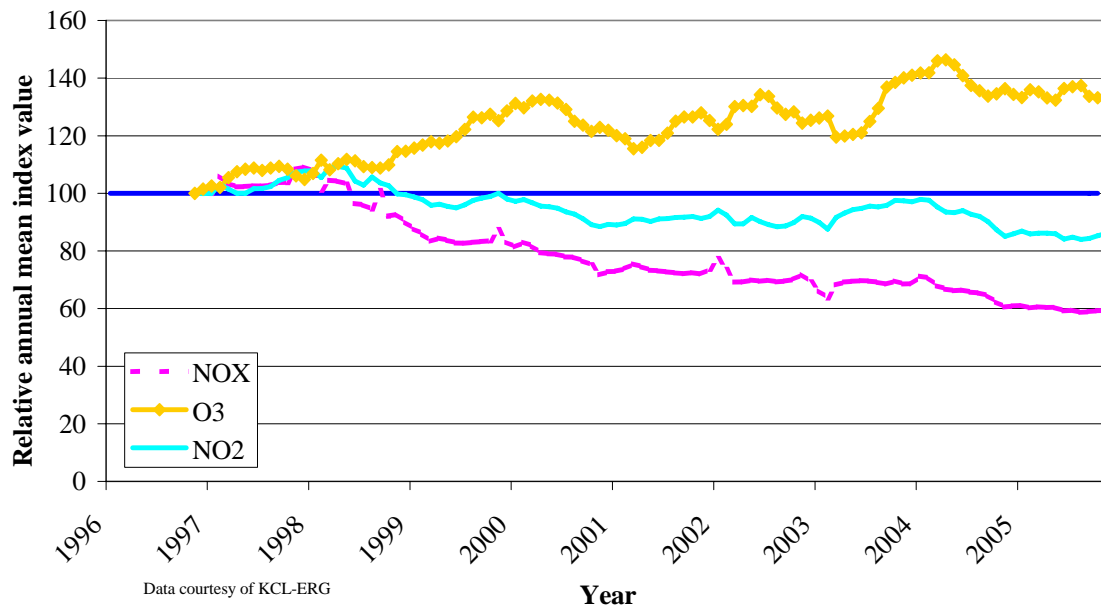


Figure 2

Relative annual mean concentrations of NOX, O3 and NO2 from 1996 to November 2005



Figures 1 and 2 show rolling annual average concentrations of six of the pollutants measured in London. The data is an average from a number of monitoring sites across London. The sites used differ from pollutant to pollutant because not all pollutants are measured at all sites; and from year to year as monitoring equipment and available sites have changed over time. The Figures show that, in general, pollution levels have fallen over the past decade with the exception of ozone - which is a 'secondary' pollutant and reaches its highest concentrations in the summer months.

Annual average levels of NO₂ appear to vary markedly from year to year and measured concentrations are falling, though not in proportion with falling levels of NO_x. This fact indicates that emissions of NO₂ from vehicle exhausts, so called primary NO₂, may be increasing and was highlighted by the recently released draft report from the Air Quality Expert Group for consultation (Trends in Primary Nitrogen Dioxide in the UK). Many reasons have been postulated to explain this issue, which is seen in cities throughout the UK and the rest of Europe. The Mayor has responded to the consultation and his response will be posted on the GLA website.

Annual average concentrations of PM₁₀ have fallen by 30% since 1996, but further reduction has not been observed since 2000. The air quality objectives for carbon monoxide, sulphur dioxide, benzene and 1,3 butadiene were met in 2005.

Other reasons why the air quality improvements were not as large as hoped is because:

- There have been less than expected improvements in emissions from the new Euro emission standard engines under real world conditions;
- The proportion and number of diesel vehicles have increased, due to government incentives. They have higher local air pollutant emissions compared to petrol vehicles, although lower CO₂ emissions;

- The average sizes of new vehicles sold in the UK have continued to increase, which increases emissions. For example, there are increasing numbers of SUVs bought every year.

Monitoring data for 2005 from the London Air Quality Network website (www.londonair.org.uk) shows that:

- The annual average NO₂ objective was exceeded at the majority of sites (at major roads and background locations) throughout London. This was similar to the situation in 2004³.
- In addition, the hourly average NO₂ objective was exceeded at 11 sites along the major roads.
- The annual average PM₁₀ objective was exceeded at four sites alongside major roads.
- In addition, the daily average PM₁₀ objective was exceeded at eight sites alongside major roads.

Modelled air quality

Monitored data gives valuable information, but only at specific locations, so computer models are used to calculate air pollution concentrations across the whole of London, using the London Atmospheric Emissions Inventory (LAEI), weather data and geographical information.

Air quality modelling requires the use of historic hourly weather data. This enables the effects of future pollutant emissions to be predicted under real weather conditions. The calculated air pollution concentrations can then be compared to the key air quality objectives. The choice of weather data year affects the results, as in some years the weather is more 'favourable' for dispersing some pollutants than other years. PM₁₀ levels are particularly affected by weather conditions since a large proportion of it can be transported into London by winds from elsewhere. As modelling relies on compiled estimates of emissions, and the data required takes time to prepare, there is a considerable lag before modelling data is available each year. This report shows the modelling for 2003, the most recent undertaken.

Figures 3 and 4 below show the concentration of NO₂ and PM₁₀ respectively for 2003 when modelled with the weather data observed in 2003. The colours ranging from yellow to red indicate incremental exceedence of the national air quality objective levels. Weather conditions in 2003 were less favourable than the year before, producing higher levels of NO₂ and PM₁₀.

³ King's College London; *Air Quality in London 2004*, London Air Quality Network Report 12, London

Figure 3 Annual average nitrogen dioxide (NO₂) concentrations in microgrammes per cubic metre in 2003

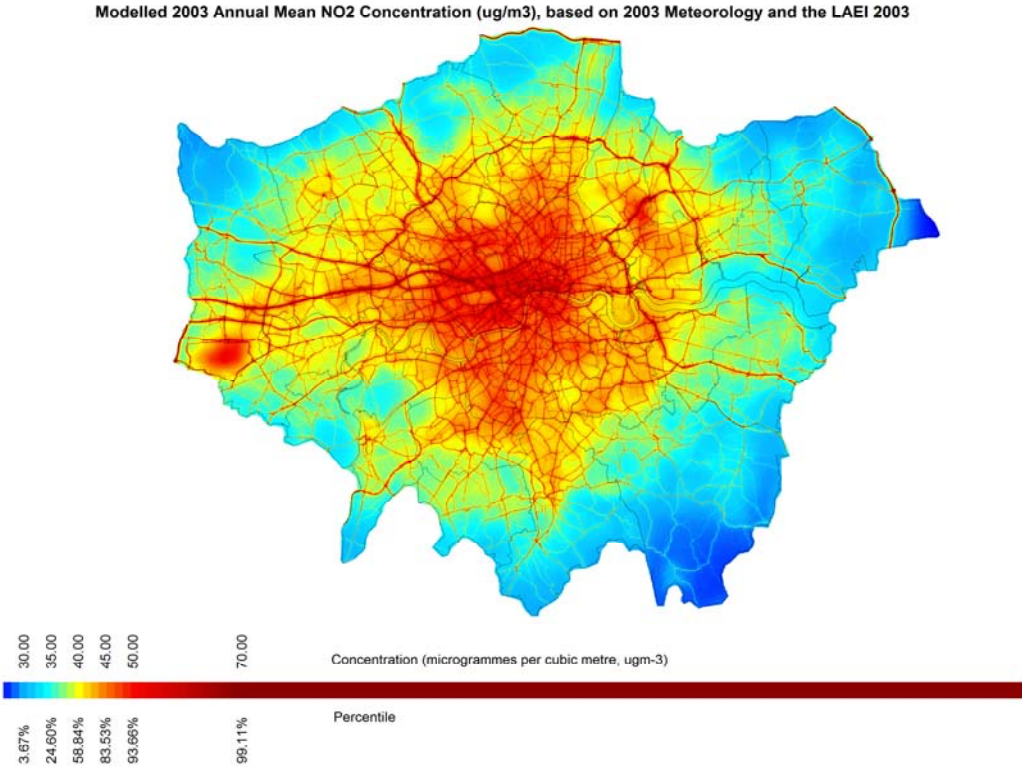
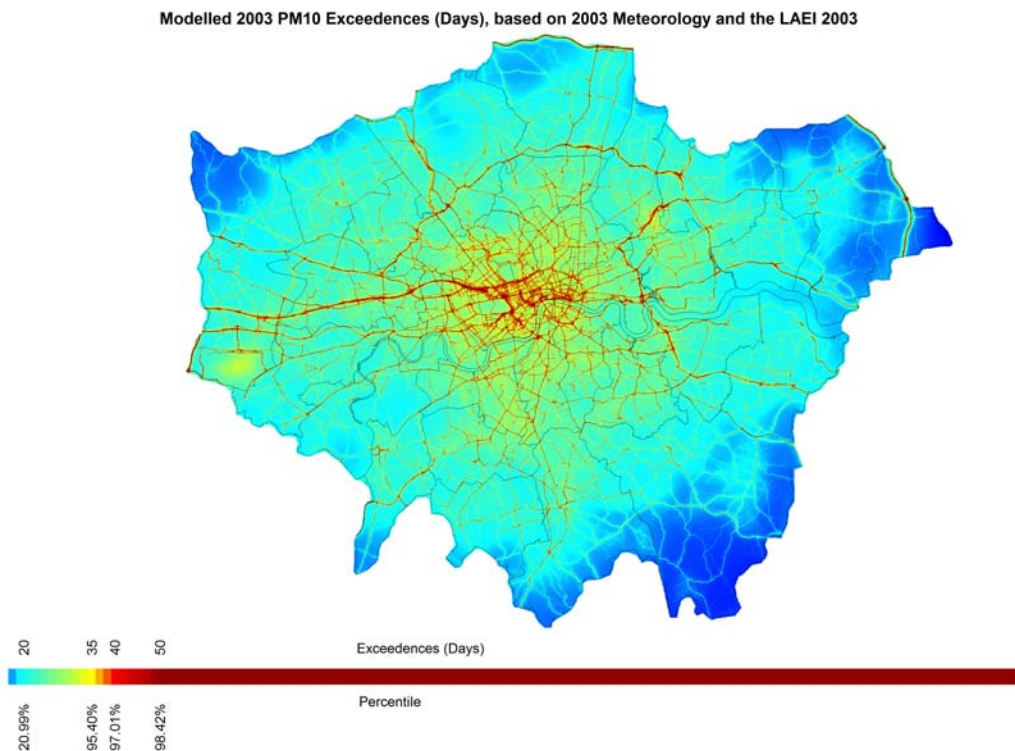


Figure 4 Daily average PM₁₀ concentrations in number of days above 50 microgrammes per cubic metre in 2003; the national objective is 35 days per year.



Road transport and air quality

Road transport is responsible for the single largest source of pollutant emissions that are harmful to human health – namely nitrogen dioxide (emitted as oxides of nitrogen) and particulates (PM₁₀). Data has been taken from the London Atmospheric Emissions Inventory (LAEI) to produce Figures 5 and 6, below. They show the relative proportion each mode of transport makes to total transport emissions for two separate years – 2005 and 2010.

The Low Emission Zone proposed from 2008 will regulate HGVs, buses and coaches (section 4.1); and taxi emissions will be regulated through the Mayor's Taxi Emissions Strategy (section 4.3).

Emissions from light goods vehicles (LGVs) and cars constitute a significant proportion of the total emissions of NO_x and PM₁₀. This is mainly due to:

- A large proportion of both LGV and cars are diesel powered;
- The significant amount of vehicle kilometres driven each day on London's roads.

Although heavier LGVs are proposed to be included in the second phase of the Low Emission Zone, lighter LGVs and cars are not. More detail can be found in the consultation report prepared for the Mayor (www.tfl.gov.uk/tfl/low-emission-zone)

Figure 5

Emissions of NOx from different vehicles in London as a proportion of total road transport emissions for 2005 and 2010

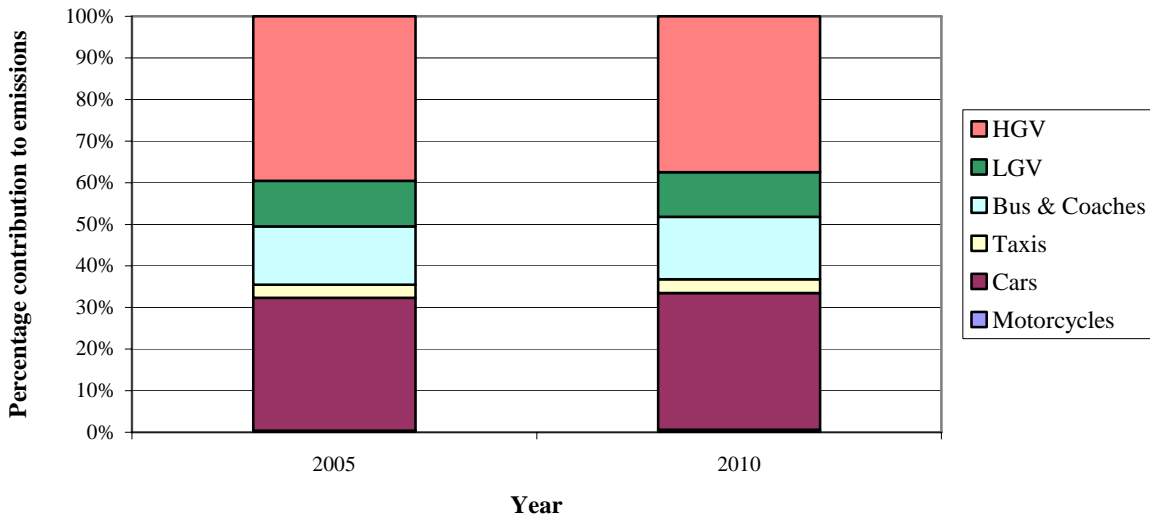
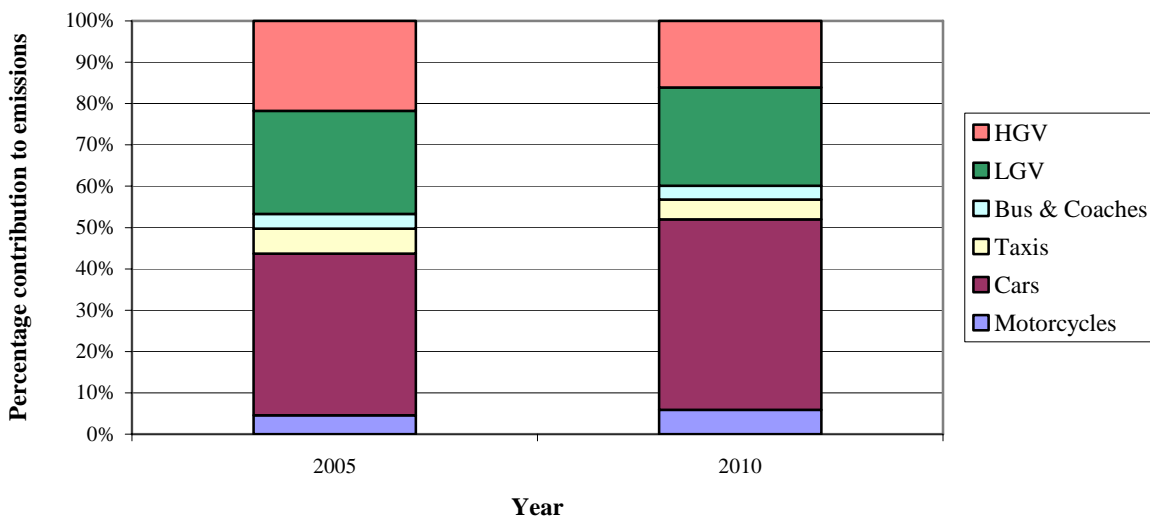


Figure 6

Emissions of PM10 from different vehicles in London as a proportion of total road transport emissions for 2005 and 2010



3. Progress on implementing the Mayor's Air Quality Strategy

The Strategy provides an overarching policy framework to improve London's air quality. There are 30 policies and 87 proposals, though 11 proposals have been completed. The priorities for air quality are:

- Implementing the Low Emission Zone and associated projects;
- Reducing the climate change impacts of transport
- Improving the sustainability of the GLA Group;
- Working with and through London boroughs; and

- Research to support policy development and implementation

4.1. Low Emission Zone (LEZ)

Following on from the recommendations of the London Low Emission Zone Feasibility Study, in his 2004 election manifesto the Mayor proposed, subject to consultation, to designate Greater London as a Low Emission Zone – where the most polluting heavy vehicles will be discouraged from entering London. In 2005 the Mayor formally delegated to TfL responsibility for preparing and consulting on revisions to his Transport and Air Quality Strategies to allow for a London LEZ.

TfL's consultation on these Transport and Air Quality Strategy Revisions finished on 24th April 2006. The key issues arising from the consultation were:

- Debate over which types of vehicles should be included and the possibility for exemptions;
- Concerns over the timescales by which operators would have to comply with standards;
- Concerns around the financial implications of complying with the proposed scheme;
- Whether or not Euro standards or a rolling age-based scheme should be used;
- Whether or not a standard for NO_x should be included in the proposals.

TfL considered all issues raised during the consultation in detail and as a result recommended the following changes to the LEZ proposal. More detail can be found in the consultation report prepared for the Mayor (www.tfl.gov.uk/tfl/low-emission-zone):

- Phased introduction of a Euro III standard for PM from early 2008 for HGVs, buses and coaches over 12 tonnes (previously over 7.5 tonnes), and mid 2008 for HGVs, buses and coaches under 12 tonnes;
- Delayed introduction of a Euro IV standard for PM for HGVs, buses and coaches from 2012;
- Inclusion of a standard for minibuses and the heaviest LGVs in 2010;
- Decision not to proceed with a standard for NO_x in 2010.

Following a decision by the Mayor on the 25 July to proceed with developing detailed proposals for a LEZ scheme, TfL is drafting a Scheme Order on which a LEZ consultation beginning this autumn will be based. This consultation will start in November and run for 12 weeks concentrating on the details of a LEZ, such as the boundary, level of charge, hours of operation, possible exemptions, vehicles to be included and the proposed emissions standards. At the time of consultation, detailed information will be provided on the scheme and the expected impacts of the LEZ.

Following consultation on a Scheme Order, TfL will write a report for the Mayor detailing the representations received. The Mayor will then make a decision on whether or not to proceed with the LEZ, with or without modifications to the proposal. If the Mayor confirms the Scheme Order, the earliest a LEZ could be operational would be February 2008.

Whilst the introduction of an LEZ alone would not bring London into full compliance with the Government's national air quality objectives, it would reduce the concentration of particulates and the areas of London that exceed the objective for particulates. In addition, it would produce health benefits including reductions in deaths brought forward, reductions in years of life lost and reductions in hospital admissions for respiratory illness as a result of reduced PM₁₀ emissions. Reducing the exposure of Londoners to these pollutants would ease some

cardiovascular and respiratory conditions such as asthma. Non-health benefits include reduced damage to building materials and building soiling.

The air quality team are heavily involved in ensuring that the LEZ delivers improved air quality and helps the Mayor work towards the EU and national limit values. The team is working closely with key TfL and specialist communication staff on this issue.

4.2. Reducing the climate change impacts of transport

As transport has a large impact on the emissions of carbon dioxide, as well as on local air quality pollutants, the Air Quality Team is leading on policies to reduce the impact of transport emissions on climate change. Specific areas of work include:

- **Low carbon vehicles**

As well as being responsible for the single largest source of local air pollutant emissions that are harmful to health, road transport in London also contributes 17 per cent of total carbon emissions; it is one of the few sectors where carbon emissions are still increasing. The Government and EU are encouraging motor manufacturers to produce low carbon vehicles and the Air Quality Team help develop policies that encourage their use within the GLA Group and by other organisations in London, including the TfL bus trials (Section 4.3) and the London Hydrogen Partnership's Transport Strategy (section 4.6). In general, vehicles that use hybrid technologies (where a conventional engine is used in conjunction with an electric motor) can reduce energy use by 25 per cent or more – reducing emissions of local air pollutants and carbon dioxide.

- **Biofuels**

Biofuels are derived from plants and their use has the potential to reduce emissions of green house gases, because they absorb carbon from the atmosphere as the plants grow. The EU biofuels directive⁴ specify for all member states to achieve a 2 per cent market share from biofuels by 2000, rising to a 5.75 per cent market share by 2010. The European Institutions are currently looking at further efforts, and possible legislative instruments, to promote biofuels in the Biofuels Strategy.

On a well to wheel basis, currently available biofuels can begin to reduce carbon emissions, depending on the source, production and transportation methods; though emissions of NO_x can be higher when using biodiesel. In general, biofuels are made from food grade plant products – oils for diesel and sugar for ethanol (a replacement for petrol). In the future, 'second generation' biofuels will potentially achieve a much larger carbon reduction as they will generally be made from non-food plants and/or waste – producing fuels such as biodiesel, bioethanol, biomethane (to replace natural gas) and biohydrogen. The Air Quality Team is researching available data to develop policies that encourage the use of biofuels in London.

- Help introduce **70 new hydrogen fuelled vehicles** to London's street by 2010. TfL have agreed to implement the proposal in the London Hydrogen Partnership's (LHP) Action Plan to introduce 70 new hydrogen fuelled vehicles into London by 2010. The target is made up of a minimum of 10 new buses and the rest will be smaller vehicles including cars. The Air Quality Team is working in partnership with TfL and the LHP and other partners to help develop this project and the associated refuelling infrastructure.
- Participate in **UK Sustainable Hydrogen Economy Consortium** (UKSHEC) discussions. The UK Sustainable Hydrogen Energy Consortium (UKSHEC) is a four-year (2003-07),

⁴ EU Directive 2003/30/EC of 8 May 2003

£3.5m initiative, funded under the EPSRC's SUPERGEN programme, involving eight leading UK universities and research centres, and the GLA. It will target many of the fundamental research challenges regarding the production, storage, distribution and utilisation of hydrogen. In addition, UKSHEC will research the feasibility and acceptability of sustainable hydrogen as an energy carrier.

4.3. Improving the sustainability of the GLA Group

The GLA Group has a small but very visible direct impact on London's air quality, particularly through the bus and taxi fleets. The Mayor decided early on in his first term of office to lead by example and demonstrate to others how improvements in air quality could be achieved. The GLA Group has policies to reduce emissions from its vehicle fleets, its other operations, and from the many buildings that it occupies.

The Air Quality team organises and chairs the GLA Group Cleaner Transport Forum, which brings together fleet managers and environment managers from the various functional bodies. This forum considers key cross cutting issues and initiatives, such as the work on hydrogen, the proposed Low Emission Zone and emissions quantification.

Many of the Mayor's targets for the GLA group were to be met by end of 2005. This progress report explains what action is being taken now to fulfil improved emissions until new proposals are developed.

Transport for London

Transport for London (TfL) has included environmental performance within its business plan since 2004. This ensures the Mayor's environmental policies and targets are fully integrated into its mainstream activities. A list of action towards achieving the targets in the MAQS follows:

- TfL Buses were required to ensure all buses achieved a minimum of Euro II emission standards across the fleet by December 2005 as well as being fitted with a diesel particulate filter. The Air Quality Expert Group's consultation document Trends in Primary Nitrogen Dioxide in the UK indicated that fitting particulate traps to London buses causes of increased primary NO₂ emissions. TfL were aware that the proportion of NO_x emitted as NO₂ was higher for diesel vehicles and those fitted with particulate traps and carried out in depth research into this issue and possible solutions, which led to the technology trials outlined below.

The objective in the Mayor's Air Quality Strategy for TfL Buses to achieve this emissions standard by 2005 was met. New Euro IV buses have considerably lower PM₁₀ emissions and are fitted with technologies that reduce emissions of both NO_x and PM₁₀. Therefore TfL are not intending to fit additional particulate filters to these vehicles.

- London Buses trial a number of emission reduction technologies to evaluate their environmental benefits. New technologies are being developed that will tackle emissions of NO_x and NO₂. For the last 12 months TfL are currently trialing two types of retrofit NO_x abatement equipment - Selective Catalytic Reduction (SCR) and Exhaust Gas Recirculation (EGR) on 24 Euro II and Euro III vehicles. A trial of 7 diesel-electric hybrid buses, which produce less CO₂, less NO_x and lower noise levels than standard diesel vehicles, also commenced in February 2006.

Trials of new lower polluting technologies are an ongoing target in the Mayor's Air Quality Strategy. This policy is being achieved, but is dependent on the new technologies becoming available.

- London Buses are participating in a European wide trial of hydrogen powered fuel cell buses, co funded by the EU, known as CUTE (Clean Urban Transport for Europe). Three buses have been in operation since January 2004, initially on route 25 and since September 2004 on route RV1. Due to the initial success of the two year trial, operation of the buses has been extended for a further year until January 2007, again under a co-funded EU project, HyFLEET:CUTE.

The objective in the Mayor's Air Quality Strategy to operate a two-year trial of hydrogen fuel cell buses has been met and extended.

- Smoother driving can have a significant benefit in reducing both fuel consumption and emissions, as well as passenger comfort. In January 2003 TfL introduced a BTEC training programme for bus drivers with the aim of improving driving standards. TfL met its target of training all existing bus drivers by December 2005. By March 2006 20,075 out of a total of 22,095 drivers required for daily service had received their BTEC qualification. The residual number are new drivers are permitted an additional 12 months to obtain their BTEC qualification. All new drivers will be trained on an ongoing basis.

Bus Driver training is an ongoing objective in the Mayor's Air Quality Strategy, all new drivers will continue to be trained.

- London Local Service Agreement (LLSA) services are routes that operate across the Greater London Boundary and are run commercially, or under contract to the appropriate local authority and are in addition to the bus services operated by TfL. TfL has been working with partners to ensure bus services operated under the LLSA achieved Euro II emission standards and were fitted with a particulate filter or achieved Euro III emission standards by March 2005. To date all LLSA vehicles are a minimum of Euro II emission standards but 62% are not fitted with a trap or meet Euro III standards. TfL will continue to work with LLSA operators to ensure the standards are met. All LLSA operators will also need to meet the requirements of the LEZ when this is introduced.

The LLSA strategy will continue to encourage operators to achieve a minimum standard of Euro II plus particulate filter, or Euro III, until the LEZ is introduced when all vehicles will comply with the required standards. The objective of achieving a minimum of Euro I standards across the fleet set in the MAQS was achieved

- Many buses and coaches operated by private companies in London, such as sightseeing tours and commuter services need to be covered by a London Service Permit (LSP) issued by TfL. Transport for London issued guidance for all these services to meet a minimum of Euro I emission standards by 2005, which has been achieved. All LSP operators will also need to meet the requirements of a low emission zone, when this is introduced.

Transport for London will ensure that all buses and coaches operating with a London Service Permit will meet the requirements of the Low Emission Zone.

- The Mayor's Taxi Emissions Strategy complements the LEZ initiative. It requires all black cabs operating in London to meet stringent emission standards. The Strategy is a phased approach, starting with the oldest vehicles, and ending with all 20,000 taxis meeting a minimum of Euro III emission standards for NO_x and PM₁₀ by the end of June 2008. Euro III is the most stringent standard currently available for taxis, and this requirement has driven forward the market in innovative abatement technologies for taxis which can be retrofitted to older vehicles and enable compliance with the required emission standards. The Mayor is working with the TfL Public Carriage Office and others to assess innovative cleaner taxi technologies and demonstrate their reliability and their effect on London's streets. There are currently five approved technologies that are suitable to be fitted to black cabs.

The Mayor's Air Quality Strategy stated that the taxi emissions standard would be set after taking account of the views of the taxi trade. This was achieved in March 2005.

- The Mayor, through the Transport for London Coach Forum, review arrangements for coach parking, facilities and terminals and look at how to manage the environmental impacts of coach travel, including air quality. A Coach Concordat was signed in December 2005 to encourage local authorities and coach operators to work together to improve coach parking arrangements – operators will be responsible for switching engines off when stationary and local authorities will be required to provide greater parking provision for coaches in order to reduce mileage spent looking for parking spaces.
- TfL Streets' vehicle fleet (for Directorate of Traffic Operations, Congestion Charging Unit and Traffic Policing and Enforcement Directorate) numbered 24 in 2002, but currently consists of 94 vehicles. 38 vehicles have diesel engines meeting Euro III standard or above, 28 vehicles have petrol engines meeting Euro II standard or above. A further 28 of the fleet vehicles are cleaner fuel vehicles, 10 of which are liquid petroleum gas and 18 are petrol-electric hybrids, all meeting Euro IV standard.

The objective in the Mayor's Air Quality Strategy was for TfL Streets' 34 vehicles to be replaced by vehicles powered by liquid petroleum gas. Streets are continuing the programme of replacement and trialing other alternative fuels to examine their effectiveness against operational requirements.

- TfL Streets' new Term Maintenance Contracts for managing the TLRN will become operational in April 2007. The contract requires the Term Maintenance Contractors' (TMC) fleet vehicles to meet Euro IV standards, as well as meeting Energy Efficiency Bands B or C (these are similar to the energy efficiency bandings for household appliances and are required by the EC). The contract also requires the TMC to report on vehicle type, mileage and fuel consumption. Other new and relevant contracts will require the same standards in future.

The target set out in the Mayor's Air Quality Strategy was for information to be sought from the contractors as a first step, and then contractors to be encouraged to meet a minimum of Euro II standards by 2004. This target was achieved

- Congestion leads to higher fuel consumption, and higher emissions of pollutants than free-flowing traffic at moderate speed. The London Traffic Control Centre (LTCC) continuously monitors London's traffic and works in partnership with the Metropolitan Police and bus controllers to ensure quick responses to traffic accidents and better management of the road traffic network to enable congestion to be minimised by tackling potential difficulties at an early stage. Through the LondonWorks Programme, TfL is developing systems and processes in conjunction with boroughs and utility companies to improve the co-ordination of street works and road works and hence reduce their adverse effects.

The target set out in the Mayor's Air Quality Strategy was for progress on the development of traffic management systems to be reported by TfL, as it was in the TfL Environment Report 2004.

- TfL commissioned studies to address concerns about the dust levels on the Underground system and these are available at www.tfl.gov.uk/tube. These studies have shown that the nature and levels of the dust on the Underground is not harmful to health. The individual London Underground infrastructure companies are working to reduce airborne dust.

This is an ongoing target in the Mayor's Air Quality Strategy, to continue to investigate methods of improving air quality on the Underground, and assess ways of further improving air quality on the system.

- TfL will continue to fund borough air quality improvement measures where they meet the published Local Implementation Plan (LIP) criteria and subject to funds being made available through the LIP process. LIPs have replaced Borough Spending Plans. TfL has broadened the environmental categories for which bids are received from the 2005/06 bidding round to include energy, noise, waste and biodiversity. Examples of air quality measures that have received funding include; air quality monitoring, clear zones, cleaner vehicles and for pilot schemes such as biodiesel and hydrogen projects

London Fire and Emergency Planning Authority

The London Fire and Emergency Planning Authority replaced half of their original fire fighting appliances by mid-2005, these appliances were powered by Pre-Euro, Euro I and Euro II engines and are now Euro III standard. Retrofitted particulate traps were trialed, but low exhaust temperatures meant they did not operate effectively on the fire appliance engines and were not continued. The remaining fire fighting appliances will be replaced with Euro III vehicles by June 2007, after which time all fire fighting appliances in the LFEPA fleet will meet the LEZ standard.

Support vehicles are being replaced on a rolling programme with a mixture of Euro IV rated diesel engines, alternative fuel and bi-fuel models. Trials are currently underway to determine the suitability of biofuels for use in all LFEPA vehicles. LFEPA are currently investigating the availability of retrofit technology to address further the reduction of particulate and NO_x emissions from the current/imminent Euro III standard to Euro IV and Euro V levels.

The target set out in the Mayor's Air Quality Strategy was for all vehicles and equipment to have the lowest possible exhaust emissions consistent with operational requirements and stated that all new fire appliances should be at least Euro III, and new support vehicles should be alternatively refuelled.

Metropolitan Police Authority and Service

The MPS policy is to procure the cleanest vehicles available consistent with operational requirements. The Service's approach is to utilise diesel and alternatively fuelled vehicles wherever feasible. The greater proportion of vehicles now in service are diesel-powered and the emphasis is also on maintaining as young a fleet as possible. The majority of vehicles are replaced regularly (typically 3 years for the response fleet and 5-6 years for the remainder), and so are generally close to the latest technical emission control standards. The MPS is now buying Euro IV diesel vehicles. At present, only 12 out of approximately 50 heavy police vehicles are pre-Euro II standard, all of which will either be replaced or modified before the Low Emission Zone comes into operation.

As an organisation, MPS transport fuel use has been cut through better fuel management and more efficient vehicles. The police use biodiesel in their bulk fuel supplies.

The police are now using 93 petrol-electric hybrid vehicles and 44 petrol-LPG vehicles. The Service has trialed electric vehicles in the past and has agreed to trial a hydrogen fuel cell riverboat and motorcycle, being developed by companies in the London Hydrogen Partnership. In the medium-term, until the hydrogen infrastructure is in place and practical hydrogen powered production vehicles become available, the MPS intend to increase the number of petrol-electric/diesel-electric hybrid vehicles as the range of hybrid models becomes broader.

The ongoing objective in the Mayor's Air Quality Strategy is for all new vehicles to have the lowest possible exhaust emissions, consistent with their operational requirements and

government legislation, and new vehicles to run on alternative fuels whenever practicable. This is being met.

London Development Agency

Business Engagement

Although it does not operate or manage a vehicle fleet, the London Development Agency (LDA) is promoting environmental management to businesses in London and will assist advice providers in delivering services that best meet London business needs. This advice will have a positive impact on air quality. During 2006-07, the LDA will also deliver support to businesses in achieving resource efficiency through a number of projects funded through the LDA Opportunities Fund and Business Resource Efficiency and Waste (BREW).

Development Projects

The LDA has an opportunity to provide additional leadership in terms of its own activities, in particular through its own approach to procurement and through its investment in capital projects. Through its capital projects, the LDA will seek to raise standards in terms of sustainable design and construction. The LDA has developed an "SDC Toolkit" which sets out guidance, supporting documents and decision-making tools. It assists key LDA delivery decision-makers to understand, identify and embed appropriate essential and/or preferred SDC (Mayoral) standards into development activity and incorporate SDC objectives into LDA project development, appraisal and procurement processes.

The LDA is currently working on delivering a zero carbon development, which will be key to demonstrating the commercial viability of zero carbon development.

Green Travel

The LDA is committed to demonstrating best practice on its own operations. In 2005 the Green Office group was established to ensure the LDA met this commitment and created a sustainable travel plan. The LDA is also reviewing a range of measures to encourage sustainable travel to work, which will be consolidated into a working travel plan.

Core GLA

The core GLA ensures a consistent approach by the GLA group to sustainable development, including action to improve air quality. Examples of current issues are:

- **Budget Sustainability Review** - the Mayor has recognised the central importance to the GLA group of making sustainable development one of the core concepts around which its business can be organised. As part of the 2006-07 budget process therefore he introduced a budget and sustainable development process (this replaced the budget and environment process, which had been introduced the previous year). The process aims to realise the benefits of using the cross cutting policy theme of sustainability as a tool to integrate environmental, social and economic factors into policymaking, resource allocation and implementation.
- **London Green Lifestyle Show** – this event was held in Greenwich Park in June 2005. It showcased sustainable technologies that are used in London, or are being developed. It also gave practical advice to the public on ways that they can lead a more sustainable lifestyle. Demonstrations focused on sustainable transport, including a CUTE hydrogen bus, recycling, renewable energy production and energy efficiency measures. The event was designed to be a low impact event, using minimal energy, sourcing renewable supplies where possible and minimising and recycling waste.

London Futures, funded by the LDA, have developed the London Green Lifestyle Show

concept into a roadshow, called Future London. It was on display from September 2006 at various locations around the capital.

- **Business Seminars** - communicating with London's businesses is a key step to implementing the Mayor's Air Quality Strategy. In February 2006, the Air Quality team ran a series of environment business seminars, sponsored by npower business, on the Low Emission Zone and Cleaner Transport, Sustainable Procurement and Environmental Facilities Management. These provided information on relevant Mayoral initiatives, as well as discussing how London's businesses can deliver real improvements in environmental policy and practice while still retaining a competitive edge. These seminars were designed to communicate Mayoral initiatives and policies in a coherent way, by coordinating the assorted environmental themes into a single series of seminars and were well received by participants.
- **GLA Travel Plan** - the Mayor produced a GLA travel plan in March 2005 to help staff use the most suitable and sustainable forms of transport to travel to work and when carrying out duties on behalf of the Mayor or Assembly. An annual update survey was carried out in January 2006. This initiative complements travel plans adopted by the other members of the GLA group.

The objective in the Mayor's Air Quality Strategy was to produce a travel plan to assist GLA staff. This was published in March 2005.

- **Air Quality Expert Group (AQEG) event**
The GLA and National Society for Clean Air (NSCA) hosted a workshop on 3rd March entitled "Air Quality and Climate Change – 'understanding the issues'". It focused on the draft AQEG report and was designed to broaden participants understanding of the technical interactions between air quality and climate change and mitigation options.

Findings included:

- It is vital that work continues to reduce air pollution emissions so that the national objectives are met, especially in London.
- Potential measures should undergo assessment for **both** air quality and climate change abatement.
- When assessing measures, the balance of short term air quality benefits and longer term climate change benefits should be included in the method.
- More clarity is needed regarding increased ozone levels and pollution episodes resulting from emissions from trees.
- Strong support for measures which result in benefits for both air quality and climate change.

4.4. Air quality work progressed through other strategies

The GLA Act 1999 requires the Mayor to seek to achieve consistency between his strategies. In preparing and implementing the strategies GLA officers have sought to go beyond consistency and achieve synergies, with each strategy supporting and reinforcing others, aiding sustainable development.

The Air Quality Strategy sets the overall air quality policies and takes forward the cleaner technologies aspects of emissions reduction, whereas the wider policies are taken forward by the other strategies. For example, the Transport Strategy and the London Plan take forward traffic reduction, and the Energy Strategy and the London Plan take forward energy efficiency measures. Issues such as smoother traffic flows and some aircraft issues are taken forward by TfL and the Ambient Noise Team. This section gives a summary and outline of some key joint

policies of the Air Quality Strategy; details can be found in the progress reports for the other strategies, available on the GLA website (www.london.gov.uk). Issues taken forward through other strategies involve input from the Air Quality Team.

Through the Transport Strategy

- **Traffic reduction** - one of the objectives of the Transport Strategy is to promote traffic reduction measures, including the Central London Congestion Charge, to develop cycling and walking strategies and to support businesses' travel plans.
- **Congestion Charging in central London** – The scheme came into operation in February 2003. TfL's Impacts Monitoring Reports have summarised the impact of the scheme on air quality, alongside a wide range of other indicators. The scheme initially achieved reductions in traffic of 15%, together with associated reductions in congestion of 30%. This combination of less traffic moving more efficiently resulted in significant reductions to emissions of NO_x, PM₁₀ and CO₂ within the charging zone. These reductions took place in parallel with ongoing improvements to the emissions performance of the London vehicle fleet, albeit slightly offset by a greater proportion of diesel-fuelled vehicles.

Improvements to the assessment methodology, reflecting developments to the London Atmospheric Emissions Inventory (LAEI), allow a revised assessment for 2005, published in TfL's Fourth Annual Monitoring Report (June 2006) www.tfl.gov.uk/tfl/cclondon/pdfs/FourthAnnualReportFinal.pdf. This concludes that, between 2002 (annual average) and 2003 (annual average):

- Total central London emissions from road traffic of NO_x reduced by 13%.
- Total central London emissions from road traffic of PM₁₀ reduced by 15%.
- Total central London emissions from road traffic of CO₂ reduced by 16%.

As would be expected, these reductions to emissions are not readily detectable in air quality measurements, reflecting the predominant influence of climate and other 'external' factors on medium-term ambient air quality measurements.

TfL continues to offer a 100 per cent discount from the Congestion Charge for alternative fuelled vehicles. During the period March 2005-06, there was a 17% increase in the number of such vehicles registering for the discount compared to the equivalent period in 2004-5. To the end of March 2006, there have been a total of over 12,500 successful applications for this discount.

The Central London Congestion Charging scheme was introduced to tackle congestion rather than to improve air quality. The objective in the Mayor's Air Quality Strategy for a 100 per cent discount for certain alternatively fuelled vehicles was achieved.

- **The London Freight Plan**- The London Sustainable Distribution Partnership (LSDP) has played a key role in the development of the draft London Freight Plan, currently out to consultation until 5 September 2006. The Plan seeks to encourage best practice, through the development of freight quality partnerships, a freight training initiative and production of an annual London Freight Data Report. It seeks to improve reliability of deliveries and freight movement through regulations, design and best practice, and it seeks to promote sustainable distribution through consolidation and promoting modal shift. Work to date includes the Freight Operators Recognition Scheme (FORS), which can reduce operators' costs whilst driving down road accidents and emissions in the capital. TfL have also set up a study to identify canal-side wharves and measures to encourage the movement of waste, recyclables and construction material by water and rail, and opened a construction materials

consolidation centre in south London. In its first 6 months of operation the consolidation centre achieved a 73% reduction in CO₂ with consequential reduction in the emissions of local air pollutants.

In addition, TfL have commissioned design and construction of a multi-modal refuse collection vehicle, for use on road, water and rail, and pilot is planned to run in north London later in the year. The London Freight Plan initiative will identify freight company drivers who would benefit from further training to improve their driving style, thereby reducing the cost of accidents to the company, reduce fuel consumption, and also reduce emissions.

- **London Lorry Control System** - A partial review of London Lorry Control System (LLCS) was undertaken for the London Sustainable Distribution Partnership where a number of changes to the exempt road network were proposed and agreed by the ALG TEC. It was agreed to exempt hybrid vehicles running on electric power and a trial of CNG vehicles was undertaken. This trial has subsequently been completed to assess their reduction in noise impacts (CNG vehicles are quieter than diesel vehicles and may minimise noise disturbance to residents at night).
- A number of additional TfL policies help to reduce other air pollutant emissions associated with transport. These include **travel demand management and walking and cycling initiatives**.

The relevant objectives in the Mayor's Air Quality Strategy have been achieved.

Through the London Plan

The London Plan is being revised through Early Alterations to the housing provision targets and the waste and minerals policies. The Examination in Public into the Early Alterations ended in June and the Panel's recommendations will inform the Further Alterations. The main focus of the Further Alterations will be the challenge to the planning system of mitigating and adapting to climate change and the need to meet CO₂ emissions reduction targets and promote the move to more on site use of renewable energy. The implications of the Further Alterations will be assessed through the Sustainability Appraisal/ Strategic Environmental Assessment, including any impact on air quality.

- The Supplementary Planning Guidance to the London Plan on Sustainable Design and Construction has been published and promotes good quality development, design and construction in relation to both outdoor and indoor air quality.
- The London Plan, through guidance to the London boroughs and guidance in relation to planning applications referred to the Mayor, ensures that air quality is taken into account at the planning application stage and that formal air quality assessments are undertaken where appropriate.
- Improving the integration of land use and transport policy and reducing the need to travel, especially by car, reduces fuel consumption and emissions of air pollutants.
- The London Plan promotes the provision of the refuelling infrastructure to support the increased use of cleaner transport fuels. However, withdrawal of Energy Saving Trust TransportEnergy grants and poor incentives via fuel duties has discouraged the conversion of vehicles to alternative fuels.

Examples of links with other mayoral strategies include:

- The Mayor is preparing a **Climate Change Adaptation Strategy** for London - the Strategy will help London and Londoners prepare for the opportunities and challenges presented by inevitable climate change. Climate change will affect air quality through increasing the seasonality of rainfall (drier summers and wetter winters) and a predicted

increase in anticyclonic weather conditions that cause intense ozone episodes. Higher summer temperatures may increase peoples' vulnerability to poor air quality and also change behaviour - possibly encouraging more outdoor living and air conditioning.

- Promoting **energy efficiency** and the use of **renewable electricity** through the Energy Strategy, particularly where this is done on site, will reduce the amount of electricity required from conventional power stations and, in turn, air pollutant emissions. More detail is included in the Mayor's Energy Strategy Progress Report, available at www.london.gov.uk.
- Contributing to the Mayor's response to the **Government's Energy Review** consultation. London currently consumes a similar amount of energy as either Greece or Portugal. About a quarter of this energy is electricity (the majority of which is generated outside London) and 60% is heating, which has a significant impact on air quality. London's population is expected to grow rapidly to 2025 - with 700,000 more people needing new homes, jobs and office space. Business as usual, with energy use, local air pollutant and carbon dioxide emissions simply rising in line with growth, is not an option.

The Mayor's response is to cut London's energy use by 23% by 2025 through a combination of efficient supply through combined heat and power and energy saving measures in homes and businesses. Together with a rapid expansion of renewable energy from wind, solar photovoltaics, biomass and waste energy sources within London, this would also mean a reduction in local air pollutant emissions. For more information, see the Mayor's response to the Government's Energy Review. It is available on www.london.gov.uk

- There is a significant benefit to **biodiversity** from measures taken to reduce air pollution in London, which are listed in the Mayor's Biodiversity Strategy. Although none of the work reported here is specifically for biodiversity objectives, benefits to animal health and a lower impact on sensitive habitats will flow from much of the other work that is reported.
- The Mayor's Air Quality and **Noise** Strategies are mutually supportive on most issues, e.g. reducing traffic volumes, encouraging smoother traffic flow, using cleaner vehicles such as hybrids or hydrogen fuelled vehicles, and seeking application of the 'polluter pays' principle in aviation. Any tensions, for example between seeking continuous building frontages to reduce noise, and avoiding narrow, high-sided 'street canyons' which can hinder dispersion of polluted air, are resolved on a case by case basis. Relevant officers work closely together.

4.5. Working with and through London boroughs

The London boroughs have a legal duty under the Environment Act 1995 to regularly review and assess the air quality within their areas through the Local Air Quality Management (LAQM) system. If measured and predicted future levels of air pollution are above the national air quality objectives in areas where the public is likely to be exposed, then boroughs have to declare an Air Quality Management Area (AQMA). Boroughs then have to draw up an Air Quality Action Plan with policies that are designed to improve air quality within that area. These arrangements are overseen by the Mayor in London, by Defra in the rest of England, and by the devolved administrations in the rest of the UK. To ensure that there is consistency in the LAQM process across the UK, the Mayor's staff liaise regularly with Defra and the devolved administrations.

Thirty two of the 33 London boroughs have now declared one or more AQMAs for exceedences of nitrogen dioxide and/or fine particles (PM₁₀). Thirty one of these boroughs have submitted either a Draft or Final version of an Action Plan for comment from the Air Quality Team. The Mayor's Air Quality Strategy contains a detailed list of measures that he expects to see in action plans. The review process ensures that this list is complied with.

As part of the current round of air quality review and assessment, Defra required authorities to produce Updating and Screening Assessments (USAs) by April 2006. 94% of these reports had been received by September 2006. The Air Quality Team is working to ensure that boroughs submit the required reports as soon as possible. The Mayor is empowered to issue a direction to London boroughs if they fail to discharge their legal duties with regard to LAQM.

The USAs indicated that there might be new air quality problems in five of the boroughs; therefore they are required to produce a Detailed Assessment by April 2007. The remaining boroughs must produce a Progress Report by the same date, which will include their latest monitoring data and details of any future developments in their boroughs that may affect air quality. All authorities must also produce a Progress Report on their action plan (APPR), where they have one, by April 2007. The Air Quality Team comments on all these documents on behalf of the Mayor.

If air quality Review and Assessment reports and Action Plans are found to be unsatisfactory, the Mayor has the power to issue a Direction to the borough concerned. The Mayor has issued warning letters to boroughs in the past but in all cases the boroughs have then taken the necessary action without a formal Direction being issued. The threat of giving a formal direction was not needed last year. The Mayor is also a statutory consultee on the air quality work undertaken by the 17 local authorities adjacent to London.

In terms of the Mayor's Air Quality Strategy, the purpose of reviewing the London boroughs air quality work is to ensure firstly that their work is undertaken in line with national guidance and appropriate consideration of current understanding. Secondly, it is to ensure that the boroughs implement the Mayor's Air Quality Strategy through their work, and that it is of satisfactory quality. Through the Mayor's review of borough air quality work, the boroughs are also encouraged to ensure that their industrial processes do not cause air quality exceedences.

The objective in the Mayor's Air Quality Strategy is to review all borough reviews, assessments and plans. This is ongoing.

The Mayor encourages boroughs to use vehicles with the lowest exhaust emissions whenever possible and the Municipal Waste Strategy Team ensures waste authorities specify minimum emission criteria for all waste vehicles when awarding new waste contracts. The criteria should comply with the current applicable Euro standard, or the previous euro standard with suitable after treatment as a minimum. These criteria will form part of the review of the Mayor's Municipal Waste Strategy, planned for later this year.

The objective in the Mayor's Air Quality Strategy is for a minimum standard to be set for refuse collection and other waste vehicles through the waste and recycling contracts. This has been achieved.

The Mayor, through TfL, provides boroughs with funding to implement the Mayor's Transport Strategy, which includes some transport aspects of the Mayor's Air Quality Strategy, and boroughs air quality Action Plans. The Air Quality Team reviews Local Implementation Plans (LIP) applications (which replaced the previous Borough Spending Plan (BSP) system), and has advised on schemes that could be funded, wholly or partly, by TfL. The Team has contributed to the updated LIP guidance so that this includes advice on the air quality aspects of transport.

The Mayor provides proactive support to the boroughs where possible. This includes support on specific problems and on more general issues, including disseminating information through conferences and other media, and sharing best practice. The Mayor has worked in partnership

with the London boroughs and other organisations to ensure valid information is used to inform air quality policymaking.

There have been a number of initiatives that the Mayor and the boroughs have undertaken together. These include:

- Proposal 65 in the Mayor's Air Quality Strategy expected boroughs to establish a fleet emissions standard survey. This work was led by the ALG on behalf of all boroughs, through the Clean Fuel Vehicle Working Group in 2004. An updated survey was sent to boroughs earlier on this year. The results were still being collated at the time of going to print. Each borough will receive an individual report with recommendations and examples of best practice to improve emissions and fleet operations, to assist boroughs in reducing emissions from their vehicles.
- A draft London-wide Best Practice Guide to Reduce Dust and Emissions from Construction and Demolition (BPG), has been produced by the borough working group (APPLE - Air Pollution Planning and the Environment) and the Mayor. The BPG has been consulted upon and will be published in autumn 2006.

The relevant objectives in the Mayor's Air Quality Strategy were achieved. However, in the case of the Code of Construction Practice (now referred to as the Best Practice Guide), this is being done in cooperation with the London boroughs and to an extended timescale.

Major planning applications are referred to the Mayor under the Town and Country Planning (Mayor of London) 2000 Order and the Mayor has power to direct refusal of planning permission. The Mayor also comments on Local Development Schemes and provides a formal opinion as to whether Local Development Documents (LDDs) are in general conformity with the London Plan. The London Plan has policies linking with those in the Air Quality Strategy, and the Air Quality Team advises on the air quality implications of LDDs and major planning applications. The aim is for the Olympic and Paralympic Games in 2012 to be the 'greenest' ever and the Air Quality Team are providing advice on the development and operation of facilities.

The Mayor reviews the air quality aspects of referred planning applications where air quality is likely to be an issue. A screening method and a series of checklists have been developed to help process applications. The Air Quality Team responded 36 of the 38 planning applications referred to from the GLA Planning Team.

The objective in the Mayor's Air Quality Strategy was to review planning applications and LDDs following publication of the Strategy. All major planning applications specifically referred to the Air Quality Team have been reviewed.

4.6. Air Quality work progressed through partnerships

In addition to the earlier sections covering implementation through the GLA Group (section 4.2) and through the other strategies (section 4.3) there are also a number of formal and informal partnerships that the Mayor uses to implement his Air Quality Strategy.

- London Hydrogen Partnership – The London Hydrogen Partnership is working towards a hydrogen economy for London. This followed the Mayor and the Chief Executive of the LDA's joint proposal for London to become a world leader in fuel cell technology⁵ It is chaired by the Deputy Mayor of London, and its members include: Air Products, Association of London Government, Baxi Group, BMW, BOC, BP, Carbon Trust, DTI, Energy Saving

⁵ Proposal to the Mayor making London a world leading city of zero-emission technology and inviting the fuel cell industry to the capital. Mayor's Cabinet 24.10.00

Trust, Greater London Authority, Health and Safety Executive, Imperial College, Intelligent Energy, Johnson Matthey, London Climate Change Agency, London Development Agency, London First, Rolls-Royce, Thames Water and Transport for London.

The Partnership aims to accelerate activities that will achieve the goals set out in the London Hydrogen Action Plan, which also help implement the Mayor's Energy Strategy and comprise of the following:

- Support the development of a hydrogen economy for London – an overall energy infrastructure based on hydrogen as a principle energy carrier.
 - Contribute to the growth of London's green economy through the development of hydrogen and fuel cell-related industry and employment.
 - Improve air quality and reduce greenhouse gases and noise in London.
 - Improve energy security for London.
-
- The Air Quality Team is working with the London Climate Change Agency to identify synergies, particularly relating to transport emissions; a key source of both local air pollutants and greenhouse gases.
 - The Mayor has used various mechanisms to disseminate information to London's business community, including chairing or contributing to conferences, and a series of business seminars. The Air Quality Team is also involved in various policy and technical forums, to bring the Mayor's policies and proposals to a wider audience. These include the Cleaner Transport Forum (other members include Government and trade bodies) and the Government's Air Quality Forum (which brings together air quality policy makers and stakeholders).
 - As yet no progress has been made on working with train operators and/or the rail regulator to reduce emissions from trains. However, the Mayor will gain responsibility for one of the rail franchises (North London Railway) in 2007. The latest version of the London Atmospheric Emissions Inventory contains vastly improved information on train operations in the London area and the resultant air pollutant emissions and this will provide a much better basis for discussions with the industry in the future. The emissions contribution from trains is relatively small. In 2003 they accounted for approximately 5% of NOX emissions, 4% of PM10 and 0.5% CO2 in Greater London.
 - The Environment Agency has improved its mechanisms for identifying and controlling emissions from the processes it regulates since the publication of the Mayor's Air Quality Strategy, leading to fewer exceedences of the process emission limits.

4.7. The Mayor's Air Quality work and individuals

The Mayor encourages individuals to play an active role in improving London's air quality. We all contribute to air pollution and through our own, individual actions we can all help to improve the air we breathe. There are 7.4 million residents in London, constituting almost 3.1 million households and 11 million trips are made daily in the capital by car or motorcycle. Choices people make with respect to transport, buying goods and energy use can have a significant and cumulative effect.

Some people are resistant to change either because they do not accept the need or because they feel that their individual action will have little or no effect. However, many people want to know how they might contribute to a better environment. The GLA website includes extensive information on air quality issues, addressing questions such as "what individuals can do to help", "what is air pollution" and "what impact does it have on health?" It also includes information on what the Mayor is doing and what businesses can do.

The Air Quality Team respond to many letters to the Mayor and other queries on air quality and cleaner, low carbon transport issues from members of the public, Assembly Members and other organisations.

The objective in the Mayor's Air Quality Strategy is for the Mayor to encourage individuals to play an active part in improving London's air quality. This is ongoing.

The London Atmospheric Emissions Inventory and other research

Research is essential to underpin policy development. The London Atmospheric Emissions Inventory (LAEI), produced by the Mayor, is particularly important in this respect. The inventory quantifies the contributions from different sources, and enables modelling of recent and future air quality to be undertaken.

The Mayor's aim is to produce the London Atmospheric Emissions Inventory on an annual basis. As there is a complex set of data to collect and collate the most up to date information is approximately 18 months old. The LAEI 2003 is now available. It contains the most up to date information on current and estimated future emissions in London from all identifiable sources, including transport, buildings and industry. Even so, there are gaps where data does not exist and has to be estimated - the emissions from major construction sites for example.

The Mayor, TfL, the London boroughs, Government departments, and other organisations use the LAEI to predict current and future pollution concentrations, assess the impact of policies to improve air quality, and assess the impact of potential new developments. The LAEI will continue to be improved, through feedback from users, the addition of new information, and improved procedures and methodologies at each annual update.

The objective in the Mayor's Air Quality Strategy was to produce, with TfL, an annually updated emissions inventory. This has been achieved, although there have been some delays as a result of the incorporation of new and improved data.

Air Pollution Research in London (APRIL)

The Air Pollution Research in London (APRIL) network brings together the research community and those responsible for air quality management to establish priorities for research, and to collaborate in fulfilling these research needs. It was established with funding from the Engineering and Physical Sciences Research Council (EPSRC) and is now supported financially by the Mayor, Environment Agency, Defra and London boroughs. Its activities encompass research on the measurements of pollutant concentrations, meteorology, emissions, atmospheric chemistry, the impacts of air pollution on human health and on London's flora and fauna, indoor air pollution, and the social and economic aspects of air quality management.

Exceedence of the air quality objectives, particularly the objective for fine particulate matter (PM₁₀) occurs largely along and close to major roads. The EPSRC funded APRIL to run the DAPPLE (Dispersion of Atmospheric Pollutants in the Local Environment) project. It has been investigating the dispersion of pollution within streets and between buildings in the Marylebone Road area. The Mayor has supported this project financially for additional work to be undertaken in order to improve understanding of the dispersion of road surface dust. Follow up work is currently being discussed with TfL.

Presenting London's case to the government and the EU

Even with all the measures taken by the Mayor, and the currently planned national measures, the national air quality objectives for PM₁₀ in 2004 and for NO₂ in 2010 will not be met everywhere in London.

The European Union sets the framework for the air quality targets, and provides the most significant tools to improve air quality. These include setting standards for cleaner fuels, the 'Euro' standards for cleaner vehicles, setting emission limits for many industrial processes and large combustion plants, and setting emission ceilings for the release of a range of pollutants within each of the 25 member countries. The UK Government has control of taxes and grant schemes to encourage the take-up of these cleaner technologies. The UK Government also controls the legislative framework within which the Mayor and the GLA Group operate.

The Mayor is therefore pressing all relevant organisations in both the national and EU arenas to do more to meet the objectives, as outlined below:

National measures

The Air Quality Team works closely with officials in the Air and Environmental Quality division of Defra as well as with officials in other government departments. The most important issues are as follows:

- The Mayor has been calling on Government for more action to reduce pollutant emissions in the rest of the UK and Europe which affect air quality in London. The Mayor makes his views known through responses to consultations by the Government and its Agencies, and through forums such as the Defra's Air Quality Forum.
- The Mayor has worked with the Energy Saving Trust on various issues, including trying to optimise the emissions benefits of transport grant schemes (although the grants to help vehicle owners pay the extra cost to buy low emission vehicles were scrapped on 7th June 2006). The Energy Saving Trust does provide the Mayor with advice on proven vehicle emissions abatement technologies (retrofitted equipment and alternative fuel conversions) and, in particular, has provided advice on technology for the Mayor's Taxi Emission Strategy and the Best Practice Guide on Construction and Demolition.
- The Department for Transport has established three panels of technical experts to improve scientific understanding and assessment methods in relation to air quality at and around Heathrow Airport. The panels cover emission sources, air quality modelling, and ambient air quality measurement. The GLA is represented on the emission sources panel and the panels' remit is limited to providing scientific and technical advice and does not cover the principle of further development at Heathrow Airport. The Air Quality Technical Report is available at:
http://www.dft.gov.uk/stellent/groups/dft_aviation/documents/divisionhomepage/612123.hcsp.
- The Government and various agencies have responded on a number of the issues, and are cooperating with TfL on the implementation of the LEZ at present.

The objectives in the Mayor's Air Quality Strategy of presenting issues of concern to government have been achieved, although the results have been variable.

European Union measures

The Air Quality Team also works with EU officials as many national targets derive from EU legislation, the Mayor has sought to influence and engage in EU air quality policy via the key events and activities listed below:

- London's air quality strategy has been presented at a European Parliament Hearing, on the Thematic Strategy on Air Quality, the Thematic Strategy on the Urban Environment and the Euro V vehicle emission standard directive;
- The Air Quality team also attended a conference entitled "Towards Clean Air for Europe: A Challenge" at Siracusa, Italy, in November 2005. This event followed shortly after the launch of the European Thematic Strategy on Air Pollution, and provided an excellent opportunity for discussion with European Commission officials, and other nations and regions;
- London's European Office in Brussels held an exhibition and reception on climate change and air quality for key European officials in November 2005 to present the challenges and good practice of London.
- The Mayor, the GLA, TFL and London's European office have frequent meetings with EU officials, MEPs and colleagues representing other European cities in Brussels;
- The Mayor hosted meetings on the EU's air quality strategy in London with Commissioner for Transport Barrot and Commissioner for Environment Dimas in September 2005;
- There have been regular meetings with European Commission staff on air quality and the proposed Low Emission Zone, and London's activities around hydrogen;

The EU institutions and other cities around EU have shown great interest in London's air quality initiatives - e.g. congestion charge, London Hydrogen Partnership and plans for LEZ.

Relations with EU officials are good and in general they are now much more aware of the challenges faced by the largest European cities such as London, and where additional support and dissemination of good practice is needed.

4. Looking to the Future

As shown in section 3, London's air quality has generally been improving in the years following the publication of the Mayor's Air Quality Strategy. This is expected, due to Mayoral initiatives and to the increased numbers of cleaner vehicles on our roads as older vehicles are scrapped and replaced with new models. However, this trend is not linear as air quality depends on the quantity of pollutants emitted, chemical processes in the atmosphere, and the weather. If the emissions have reduced from one year to the next, but the weather is unfavourable, then an improvement in air quality will not necessarily be observed. The London Atmospheric Emissions Inventory and the modelling work discussed in section 3 are essential to assess the influence of the Mayor's Air Quality Strategy.

Many of the targets in the Mayor's Air Quality Strategy are set for 2005. 2005 was also a key year in assessing London's compliance with both EU and national air quality objectives. Significant areas of London exceed the annual and hourly average NO₂ and annual and daily average PM₁₀ objectives and are predicted to continue to do so.

The Government should use its review of the National Air Quality Strategy to develop policies and actions to further reduce air pollutant emissions to reduce public exposure and hotspots below the national objective and EU limit values. New policies need to tackle emissions both of local air pollutants and gases that lead to climate change.

The Mayor will review his Air Quality Strategy in 2007, it will develop existing policies to reduce emissions from transport and strengthen current policies to tackle climate change; further

improving London's environment. The Mayor will continue to work closely with the UK Government and EU to implement policies that fulfils his vision for London to be an exemplary sustainable world city.